JPRS L/8551

28 June 1979

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TRANSLATIONS ON EASTERN EUROPE
ECONOMIC AND INDUSTRIAL AFFAIRS
(FOUO 10/79)

U. S. JOINT PUBLICATIONS RESEARCH SERVICE

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APPROVED FOR RELEASE: 2007/02/09: CIA-RDP82-00850R000100060062-6

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TRANSLATIONS ON EASTERN EUROPE

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CONTENTS PAGE

CZECHOSLOVAKIA

CAPITAL INVESTMENT PLANS, DIRECTIVES FOR FUTURE YEARS DISCUSSED

Prague INVESTICNI VYSTAVBA in Slovak No 1, 1979 pp 3-10

[Article by Karol Ujhazy, deputy chairman, State Planning Commission: "Plans and Directives for Capital Construction in the Last Two Years of the Sixth Five-Year Plan"]

[Text] Last year the 12th plenum of the CPCZ Central Committee discussed the report of the CPCZ Central Committee Presidium on the main tasks of development of the national economy in 1979. At the same time, they discussed the directives for preparing the 1980 plan which also included under capital construction orientation for preparation of critical building in 1981. The CPCZ Central Committee plenum made specific the resolutions which had been adopted at the 11th plenum in the economic field for the last 2 years of the Sixth Five-Year Plan [FYP].

Delineation of tasks in the economic sphere for the next 2 years is of unusual significance:

--First, because this is the final stage of the Sixth FYP; its realization will determine to no small extent the fulfillment of the goals of the economic and social program of the party as delineated at the 15th congress;

--Second, because development of the economy in the next 2 years will appreciably influence the transition from the Sixth to the Seventh FYP. To the extent that this applies to the economy as a whole, it applies doubly to capital construction, since the impact of much of the building carried out in 1979 and 1980 will determine to no small extent conditions for fulfillment of construction plans during the years of the Seventh FYP.

Results of Investment Plan Fulfillment During the Years 1976-1978

If we sum up the results of the first 3 years of the Sixth FYP we can state that the total volume of investment in capital construction can continue to be successfully carried out in accordance with the plans. Certain structural changes can also be effected, there has been improvement in putting capacity into operation and the program of housing construction will continue

to be fulfilled. On the other hand, however, certain negative features from past years persist. Among these, in particular, is the relatively high amount of building starts which we still have not succeeded in reducing significantly, especially because of nonfulfillment of the building plan. In some branches there is slippage in meeting planned deadlines for putting capacities into operation and new capacities do not everywhere achieve planned parameters. The utilization of existing fixed assets is not improving (on the contrary, in regard to shift work a certain moderate decline continues) and their renewal or liquidation is not proceeding fast enough. We have taken only the first steps toward modernization.

Just as in the last 2 years so for the overall 3 years, the extent of investing expressed in total volume of investment has proceeded according to plan. Contrary to the Fifth FYP, however, the planned volume for the first 3 years of this FYP was not fulfilled by 1.7 percent. In the plan of the Sixth FYP, however, the deviation is more serious in the structure of work and deliveries carried out.

		Sixth FYP	Index 1978/1975 Estimate	Difference in Points
Investment work & deliveries (minus Action Z and private construction)		111.84	118.1	- 0.3
Of which:	Construction work	119.3	110.8	- 8.5
	Machinery and equipment	117.1	128.6	+11.5

All of the nonfulfillment of construction work is in that part of buildings with budget costs (RN) exceeding Kcs 2 million (with the exception of building projects designated as essential tasks) and in comprehensive housing construction (that is, in the complexity of civic and technical equipment for completing a number of finished apartments). Nor can the excess of delivery of machinery and equipment be definitely estimated because actually it all originates in the area of machinery and equipment not included in budget costs (SZNR) of building construction.

The degree of investment in the years 1976 to 1978 moved within the limits set by the FYP, or more precisely: in the last 2 years it was moderately below planned levels.

Behind the overall accord in investment volume, as in the structure of construction, the discrepancy shows up within categories of the investment plan (expressed in percentages of fulfillment of the annual plan).

	1976	1977	1978 anticipated fulfillment
Buildings with RN over Kcs 2 mil. designated as essential tasks	104.3	104.6	104.5
Remaining construction with RN over Kcs 2 mil.	88.0	88.1	91.2
Construction with special means of regulation	94.4	95.0	94.5
Buildings with RN up to Kcs 2 mil. and SZNR [machinery & equipment not included in budget costs]	103.7	105.9	104.0

As seen in the table, a definite positive feature is the overfulfillment of annual plans for buildings designated as essential tasks of the plan. On the other hand, however, the remaining construction with RN over Kcs 2 million remains--just as in the Fifth RYP and in the first 3 years of this FYP--the weakest part of our investment plan fulfillment. These low rates of fulfillment also reflect the shifting of deadlines for putting capacity into operation and the basic reason for the slower reduction in building starts. Contrary to the Fifth FYP, this development did not improve even in 1978, that is, the third year of the Sixth FYP and so nonfulfillment in the years 1976 to 1978 is relatively close to the average rate of nonfulfillment in the Fifth FYP.

The shortfall in the category of buildings with special means of regulation is caused by nonfulfillment of comprehensive housing construction. While meeting the total quota of completed apartments for 3 years, with even a moderate excess of approximately 12,000 units, the complex of both civic and technical equipment will not be met.

The definite overfulfillment of buildings with RN up to Kcs 2 million and SZNR testifies to the outflow of supply capacity on the one hand and to an easier fulfillment of overall investment plans on the other. Unfortunately, there is neither sufficient evidence nor more detailed analysis of how this increased investment in fixed assets through this category of investment is being utilized, particularly such efficient ways as more rapid renovation, modernization or intensification or replacement of labor by technology. Nonfulfillment of plans to liquidate fixed assets, however, rather indicates that this means is used to increase the number of jobs, with not always a guarantee of their effecitve utilization. Part of the investors' argument for exceeding this category is also based on cost development of certain machines in this category purchased from abroad as well as from our engineering industry.

The situation with respect to putting capacity into operation is only slowly improving. Even though we do not have a comprehensive evaluation of the first 3 years for all capacities, it suffices to cite as characteristic the situation in buildings designated as essential tasks of the plan.

	1976	1977	1978
No of capacities			
Annual plan	70	77	59
Actual figure	44	62	46*
Percentage	63	80	78

* Expected figure

The summary indicates that, while exceeding planned volumes for these buildings, which undoubtedly is the result of concentration of supplier capacities and investors' efforts, approximately one-fourth could not fully meet deadlines for putting the capacity into operation.

Among the positive results in this area undoubtedly belong the good progress of construction and in planned deadlines for making capacities operational in such urgent projects as construction of the transit gasline but also the decided improvement in getting electric power stations operational, whether in Chvaletice or Dalesice. The production of chemical fibers in Senice and Humenne was implemented in advance of planned deadlines. Also the ironworks in Chomutov and in Vesele na Norave were put into operation within the planned deadlines. In non-production construction one can mention the shortened deadline in building the A Metro line in Prague and meeting or even partially reducing the deadline for certain expressway sectors. Also television and radio transmitters were put into operation within planned deadlines.

On the other hand, however, last year the planned deadlines were not met for several building projects of the automobile industry (for example, Tatra - Cadca III, Autopal Hluk, and Karosa Jaromer), certain other engineering works in Povazska Bystrica, enlargement of the cellulose plant in Vranov and furniture plants in Ricany, Kralovsky Chlmec and in Trnava. The starting of new capacities merits a separate analysis of project indicators. In this area, too, we still have quite a way to go.

The investment plan indicators for the last 3 years undoubtedly show that we can take the least satisfaction from the development of building starts and the lengths of construction time. At the end of 1978 the situation was such that building starts (and also average construction times) remained on the same level as in 1975. The reasons for this state of affairs can be characterized as follows:

--The extent of building starts was not quite 3 percent higher compared with the annual plans for 1976-1978;

--The development or growth of budget costs [RN] for the last 3 years was at a yearly average of not quite Kcs 4 billion. This is a relatively better development than in the last years of the Fifth FYP;

--The volume of work and deliveries carried out on building projects with RN of over Kcs 2 million last year was approximately 10 percent lower than projected for 1978 in the Sixth FYP;

--The remaining RNs at the end of 1978 were 12 percent higher than projected in the Sixth FYP.

A comparison of the sum of worsening factors (higher volume of building starts, growth of RNs and nonfulfillment of the plan for buildings with RNs over Kcs 2 million) with the growth of remaining RNs thus shows that the worsening influences managed to be covered 55 percent by reserves which the plan sets aside for these purposes. The rest of the negative influences, however, then have the effect of retaining building starts at the 1975 level instead of their planned reduction. This result should have been corrected for the totality by increasing average-sized building projects in the years 1975 to 1978. In any case, however, a reduction of building starts in the remaining 2 years is the most imperative task of capital construction.

During the years 1976 to 1978 three percent fewer fixed assets were obtained than anticipated in the Sixth FYP. With the slippage in fixed assets from construction, there was an excess of fixed assets from SZNR [machinery and equipment not included in budget costs] and from building projects with RNs up to Kcs 2 million. It is positive that a higher accretion of machinery and equipment was achieved. This tendency, however, is also influenced by a lower liquidation rate of basic engineering assets than stipulated in the Sixth FYP--by approximately three percent.

The utilization of fixed assets in the last 3 years, however, does not have a clearly positive impact. An unfavorable tendency is seen, for example, in the fact that while the number of workers in centrally planned industry increased in 2 years by 5400, the number of jobs increased by 9480. The utilization of machine jobs in operations of continuous production processes was 0.9 points lower in 1977 than in 1975.

From this brief analysis of developments during the last 3 years we can conclude that among the very urgent tasks facing us the last 2 years of the Sixth FYP in capital construction there are some positive developing tendencies but also some negative ones.

Basic Concept of Capital Construction Plan for 1979, Directives for 1980 and Orientation of Critical Building Starts for 1981

At the 12th plenum of the CPCZ Central Committee, V. Hula in his report of the CPCZ Central Committee Presidium said, among other things: "Capital

construction remains one of the most important but also the most challenging parts of the plan." This kind of statement is justified, not only from experiences of the plan's formation and its negotiation, but also from its specifications and implementation in the last 2 years of the Sixth FYP. The complexity is based on the fact that, on the one hand, investment demand for productive and certain non-production programs is growing, and on the other hand, consistent with the 11th plenum of the CPCZ Central Committee, it is desirable for the recovery of capital construction and also for alleviation of tensions in the whole economy to consider a gradual reduction in the extent of investment in our economy. The challenge of such an approach is increased by the principle of abiding by the basic program goals issued at the 15th congress and, within the framework of reduced volumes, also of dealing with certain newly-arisin requirements for creating the transition from the Sixth to the Seventh FYP. The plan concept had to conform to developments of the firts 3 years of the Sixth FYP with all their influencing factors, especially those which have a negative impact and which must be corrected to the greatest possible extent in the last 2 years.

A conceptual view of the plan with given approaches can be characterized thus:

--While respecting the need for development of the national economy under changed condition, to adhere completely to the 1979 and 1980 goals previously set in approving the directives for 1979, that is, to reduce the volume of investment in the last 2 years by five percent and reduce by the same percentage the extent of building starts. The first part of the goal was fulfilled 5.1 percent and the second part 6.3 percent, with a much greater reduction of starts in 1979. Overall volume of investment in the national economy at the mid-year rate of growth for 1979 of 2.4 percent and for 1980 of 4.4 percent must be considered as maximum;

--Through direct and indirect devices of the plan to orient investors more insistently toward better utilization of existing fixed assets, toward better utilization of existing fixed assets, toward better assignment of jobs, toward increasing shift work and toward appropriate modernization of basic assets instead of demanding new investments and expansion of production areas in workable branches. Not to allow new capital construction when shift work with current fixed assets does not attain a coefficient of at least 1.5 with at least 90 percent of existing jobs worked in the first shift. While respecting these principles, to raise the proportion of progressive modernization, renovation and operations with rapid returns realized from investment categories for building projects with RN up to Kcs 2 million and SZNR;

--To consider rendering capacity operational as a critical part of the plan for capital construction as well as the timely completion of building projects and turning on new capacities to their projected parameters by the planned deadlines. To emphatically direct the attention of workers for investors and suppliers to this final, often critical, phase of capital construction. To create conditions for this in supplier-consumer relations and in the practical organization and management of work at building sites. To be more effective in preparing and organizing test runs and starting capacities for permanent operation;

--In the branch structure of capital construction to consider in these last 2 years the critical priorities in linking processed and approved concepts of development even beyond the year 1980, especially in the fuel and energy base, in programs meant to assure the growth of export capabilities, international economic integration or which have an anti-import character; to consider among priorities also essential capacities insuring completion of products especially in engineering and deliveries to market stocks. In comparison with the Sixth FYP and directives for the last 2 years there is increased volume of construction of atomic power plants, cellulose plants in Paskov and in Ruzomberok, investments for the development of tractor production, electron tubes, including color picture tubes and some others. In the non-production sphere the plan raises the extent of investment in railroad transport. In areas of concentrated construction the plan includes basic needs and arrangements in the North Bohemian kraj, in Prague and in Bratislava;

--The plan respects the principle of balancing resources and distributing investments in general and in individual categories. Contrary to past years, the executive plan for 1979 is moderating the tempo of growth of work and deliveries for building projects with RNs over Kcs 2 million (consistent with the results of supplier-consumer relations). At the same time, plan and organizational procedures and plan specifications should create conditions to improve through investor and supply policies any unsatisfactory fulfillment, especially in the last 2 years, of that portion of the plan applying to categories of construction over Kcs 2 million. In the plan for 1979 and in the directives for 1980 construction projects designated as essential tasks of the plan are considered as priorities.

--To express requirements of efficiency the plan decrees the rechecking of indicators for building projects which are due to begin this year and, at the latest during licensing procedures, also the adjustment of indicators which deviate from average efficiency in a given branch. Only on condition that the current level of indicators improves will it be possible to allow certain building starts this year. A similar procedure is stipulated for completion of work on preliminary designs or designing work for construction due to begin in 1980 or 1981. Decisions of state authorities for buildings with budget costs over Ksc 500 million will be submitted to the CSSR government and to national governments in case of building projects with budget costs over Kcs 200 million (from branches managed by the national governments). In the interests of reducing building starts in the last year of the Sixth FYP, but also in case it is necessary to subsequently include certain newly-originated building projects in the plan, the government decreed that the volume of starts in the draft plan be 10 percent lower than in the specified directives.

--For the guidance of pre-design preparations and the beginning of design preparation for building projects which are due to begin construction in 1981, the plan approved for 1979 also contains a listing of essential construction which is to begin in 1981. At the same time, this is based on work thus far in preparations for the Seventh FYP. The plan wants to avoid

creating in the pattern of the extent of starts in the years 1980 and 1981 an undesirable accumulation of investments at the beginning of the Seventh FYP.

--The plan notes the need to make sure of the availability of labor in order to assure new construction. For this purpose it is necessary to complete in more detail the work of liquidation and to check the feasibility of transferring workers from existing plants and operations without a further drop in shift work at the newly built capacities. In deciding on newly started building projects we must anticipate coping with newly arisen jobs and sources of labor in order to achieve better timely utilization of fixed assets.

Those are the basic principles of the plan concept and implementation of the principles of the 11th plenum of the CPCZ Central Committee for new approaches to the reproduction of fixed assets and to capital construction.

In the next part we will present at least some of the basic indicators and procedures by which these principles are being further specified and developed and how they will be carried out in this year and the next.

Certain General Indicators for Capital Construction for 1979 and 1980

This year the overall volume of investment in the national economy will grow considerably more slowly than in preceding years for reasons already given.

	1976/1975	1977/1976	1978/1977	1979/1978	1980/1979
Mid-year tempo of investment growth					
--Total investment in national economy	104.4	105.4	104.-	102.4	104.4
--Investment in national economy minus Action Z & private building	105.4	105.4	105.1	102.9	105.-

The preparation of this year's plan was complicated because of structural changes with respect to certain branches on the one hand and the slower tempo of mid-year growth, only 2.4 percent, on the other. It must be mentioned that this year's growth in investing is one of the lowest in the last 30 years. Lower tempos were achieved only in 1954, 1962 and 1963. In the past, a radical slowing down of investing did not occur without strong administrative intervention in overall capital construction until the well-known stoppage of construction starts in 1962 and 1963. This year the reduction was achieved through planning without such intervention.

It should be noted that it would be wrong to compare this year from broader standpoints with the years mentioned above. The status of the national economy is quantitatively different, positive developing tendencies predominate as indicated in the report of the 12th plenum of the CPCZ Central Committee Presidium. That is precisely why a different approach was possible than in the past.

We will have to return to the problem of the tempo of investment growth for 1980 after negotiation of supplier and consumer relations in our own plan for next year. In our opinion, there will be a certain reduction in tempo compared with that included in the directive. The tempo of investment growth next year should then move within the limits of the indeses from 103.5 to 104. In this connection, we should mention that portion of the report of the CPCZ Central Committee Presidium on the main tasks of development of the national economy in 1979 which says: "Our objective, however, is not and cannot be a simple reduction of investments or new starts. After all, efficient investments are the basis of our future development."

In view of the nonfulfillment of the plan of building operations in the first 3 years, the growth rate of building operations in the last 2 years of the FYP will be higher than for deliveries of machinery and equipment.

	Index 1979/1978	Index 1980/1979
Overall volume of investment including Action Z & private building	102.4	104.4
Overall volume minus Action Z and private building	102.9	105.0
Of which - construction work	105.7	107.1
- machinery & equipment	99.4	102.0

The planned extent of work and deliveries for this year and for 1980 is oriented primarily toward providing for the most important construction in industry, agriculture, the building trades and also in the non-productive sphere. This orientation can be partially seen by looking at the pattern of the investment plan or tempo of growth of investment according to the individual planning categories.

	Index 1979/1978	Index 1980/1979
Overall volume of investment	102.9	105.0
Of which:		
--buildings with RN over Kcs 2 million	106.1	111.8
--branches with special means of regul.	110.3	106.7
--buildings with RN up to Kcs 2 million and SZNR	95.4	96.0

The table shows a more marked concentration of resources for buildings over Kcs 2 million whether planned in this category or in the category with special means of regulation. Planned tempos for buildings with RN over Kcs 2 million are based on supplier-consumer relations, negotiated in great detail, especially for buildings designated as mandatory tasks, and for buildings which are due to be completed in 1979 and 1980. It is precisely buildings designated as mandatory tasks that make for higher tempos of growth for the time being, concentrated in 1980 in several building sites. These are primarily the atomic power stations in Jaslovske Bohunice and Dukovany, construction of the cellulose plants in Ruzomberok and in Paskov, production of Tatra trucks in Koprivnice and construction of a hydro project on the Danube. After subtraction of the planned tempos for mandatory tasks the extent of work and deliveries for the remaining construction in 1980 should grow at approximately five percent, compared with that planned for this year.

The higher tempo of growth of work and deliveries in the category of branches with special means of regulation was also confirmed for 1979 in supplier and consumer relations for individual buildings or sets of buildings. The exceptional growth rates apply this year to work on the transit gasline, also to mining projects, construction on the basic communications system and building projects in support of housing construction in Prague.

In the category of construction up to Kcs 2 million of RN and SZNR, the index forms for 1979 compared with 1978 are incomplete--in view of the fact that the anticipated data for 1978 also include excessive machinery deliveries for agriculture. Assuming a similar excess rate in agriculture for this year too, we can state that the planned volume in this category of investment would in effect be very close to the expected figures for last year. We know that in this category of investment there remain, after plan specifications, probably the greatest number of "unsatisfied" investors. Nothing remains but to suggest that VHJs [economic production units] and enterprises manage more carefully with this not inconsiderable category of investment. As development of proportions of individual investment categories show for the overall volume of investment in the national economy (minus Action Z and private construction), this category in the last 2 years too will account for an average of one-third of overall investment in the national economy.

	1978 Expected figure	1979 Plan	1980 Directive
Total investment	100	100	100
Of which:			
--construction over Kcs 2 mil. RN	38.8	40.0	42.6
--branches with special means of regulation	22.7	24.4	24.8
--buildings up to Kcs 2 million RN and SZNR	38.5	35.6	32.6

The branch structure of investment expresses the possible degree of priorities for the last 2 years according to individual branches.

	Index 1979/1978	Index 1980/1979
Combined national economy	102.9	105.0
Of which:		
Industry	105.6	109.0
including		
Fuels & energy	119.7	114.3
Metallurgy	98.6	88.5
Engineering	102.8	112.9
Chemical industry	81.2	95.6
Light industry	104.6	87.6
Wood-processing industry	121.1	155.3
Food processing industry	103.6	103.0
Building materials industry	97.4	111.2
Building production	106.4	94.3
Agriculture and forestry	85.8	100.5
Transportation and communications	102.8	99.9
Comprehensive housing construction	108.3	106.0
National committee special construction	102.2	107.1

There are definite planned priorities for the development of the fuel and energy base in the last 2 years of the Sixth FYP. These are investments for the mining of brown coal, especially in the North Bohemian brown coal basin, also thermal power stations at Prunerov II and Melnik III and the atomic power stations at Jaslovske Bohunice and Dukovany. The tempo of investment growth especially in 1979 is shared by the greater amount of work on the transit gasline and work on mining projects, especially in the Ostrava basin.

The most rapid tempos of growth apply to investments in the wood-processing branch. In 1979 and 1980 the two cellulose plants in Ruzomberok and in Paskov--included subsequently in the Sixth FYP--should be fully under construction.

In the non-production sphere, high tempos of building operations are also continuing in the last 2 years in comprehensive housing construction, especially to provide civilian and technical equipment.

Except for comprehensive housing construction, in the non-production sphere, including special purpose construction for kraj national committees, higher tempos are planned only in the North Bohemian kraj, in Prague and in Bratislava.

In the table above, for agriculture it must be added that the extent of investment in 1979 and 1980 would have to be corrected by possible and anticipated excess deliveries of machinery, which would bring the overall volume of investment in agriculture very close to the anticipated figures for 1978. (The impact of this excess in overall volume of investment in the national economy would come to about one point in the index.)

The extent of investment in agriculture in the last 2 years of the Sixth FYP should call for greater annalysis, whether from the viewpoint of higher investments in the years 1976 to 1978 than anticipated in the Sixth FYP in relation to the growth of agricultural production and development of labor, or from the viewpoint of increased efficiency of investment and optimal directions of investments in agriculture.

The branch structure of investment shows that in the great majority of branches or organizations many investors will have to limit their investments somewhat or, at the very least, utilize planned investment resources more judiciously. In any case, however, it is impossible to generally recognize the need to moderate the tempo of investing and then right away request an exception for one's own enterprise or own town. The need for a more rational approach applies to the whole extent of investing, including investment in the framework of Action Z.

Closely connected to this and a logical consequence is the need to make better use of existing basic assets.

Better Utilization of Basic Assets and Their Modernization

V. Hula stated, among other things, in his report at the 12th plenum of the CPCZ Central Committee Presidium: "We must embark on an energetic and uncompromising course to achieve better results of efficiency in investments. The existing tendencies strongly influencing extensive methods of investing must be overcome and our energy and resources concentrated on better utilization of existing basic assets and increased shift work." The urgency of this kind of orientation in the reproduction of basic assets is shown also by developments in shift work during the last 3 years (in 1978 based on results of the second quarter):

	1976	1977	1978 (2nd quarter)
Heavy engineering	1.180	1.180	1.183
General engineering	1.273	1.273	1.267
Wood-processing industry	1.241	1.243	1.241
Glass industry	1.274	1.272	1.262
Textile industry	1.349	1.342	1.338
Leather industry	1.286	1.272	1.252
Food processing industry	1.232	1.239	1.200

As early as the middle of last year the government directed all central bodies to make a check for better utilization of existing capacities, their modernization and by increased shift work in operations to make up for new construction being prepared for the years 1979 and 1980. Unfortunately, plan proposals as submitted for this year did not reflect this government directive. A more active approach was expected, especially of the engineering branch, but even of light industry and the wood-processing industry.

Contrary to the principles outlined at the 11th plenum of the CPCZ Central Committee, during formulation of the plan for this year, in the directive for 1980 there were "conflicts" about the extent of additional new building starts which would probably not improve the status of utilization of basic assets. So in the final stage of work on the plan, central planning bodies proceeded to set aside certain building projects. Thus they took out of the last 2 years eight building projects which represented a total of over Kcs 1 billion in RN. More than 3000 workers just from kraj national committee resources had been projected for these building projects. An additional 21 building projects of over Kcs 3 billion RN remained in the plan for 1979 and in the directive for 1980, in view of the fact that they were largely building projects in engineering, within the framework of previously checked off development programs. We expect, however, that by the time of actual commencement of construction the investors will once more check their shift work,

moving according to current figures at a coefficient of 1.17 to 1.37. For these building projects not only will the required addition of some 6600 workers have to be verified for the Seventh FYP but also prospects for even a higher number will have to be sought in order to insure shift work at a coefficient of at least 1.50. It need not be mentioned that the same coefficient was attained even with a smaller number of established jobs for a previously fixed number of workers but with more shift work.

In this year's plan and in the directives for 1980 the first attempt was made to assess the structure of starts with regard to modernization and remodeling of the technical production base. According to criteria prescribed in the methodology for plan preparation in 1979, the extent of modernizing and remodeling construction in selected industrial branches (minus organizations of the Ministry of Fuels and Power) represents 31.5 percent for the CSSR (of which 35.8 percent in the CSR and 31.0 percent in the SSR). The proportions of modernizing and remodeling construction differed according to the various branches. The lower figures applied to those branches where new capacities are being built in some of the development programs that were reviewed (for example, the automobile, tractor, wood-processing industries and the like). Relatively large volumes of seemingly extensive construction jobs are essentially those which are providing finishing sectors or in certain capacities providing improved life environment. Here belong, for example, the construction of sewage treatment plants, certain railroad projects, warehouses, lodges, etc. First experiences indicate that this practice will have to be consolidated and more specific criteria established to characterize this efficient course of investment.

In the directives for preparation of this year's plan, it was stipulated that the structure of industrial branches should be improved and the efficiency of machinery and equipment not included in budgeted construction should be raised, particularly by increasing the proportion of progressive modernization and of operations with rapid returns. The directives contained a moderate rise in proportions compared with those which had been planned for last year. The plans submitted and finally also approved did not, however, observe this directive everywhere in all respects. It was observed in metallurgy, in the chemical industry, in food processing, in construction and in light industry in the SSR. It was not carried out in heavy engineering (by 2.8 points), in general engineering (by 6 points) and in the consumer industry in the CSR (by 4.7 points).

On the average, for all branches for which this proportion was prescribed as an essential indicator, 34 percent of the total volume of machinery and equipment not included in the budget of construction will be expended for progressive modernization this year and the same also in 1980, according to the directive. Experiences from implementation of the plan in 1978 (even though not yet complete at the time this article is being written), but especially from formulation of the plan for this year, indicate that not all enterprises or VHJs are prepared to carry out progressive modernization, remodeling and innovations in this part of investment. Thus it is still true that not everywhere do we lack only resources but in some places also purposeful and effective programs for this in this part of investment.

The better usage of basic assets--whether existing ones or those we are building--directly determines the consistency between reproduction of fixed assets and reproduction of the labor force. The series of construction starts in the productive sphere during the last 2 years of the Sixth FYP will call for an additional 67,500 workers in the period of the Seventh FYP, 24,800 of them from kraj national committee resources. The remaining number of workers must be obtained either from liquidation of operations or plants or by transfers and from existing capacities. Even though this approved series of construction projects requires about 13,000 fewer workers than the series of projects contained in the directive, it still represents a very substantial task to provide workers in the period of the Seventh FYP from very meager sources of supply. The difficulty lies in the fact that promises from kraj national committees, even when confirmed by the Czech or Slovak Planning Commission, are still not entirely consistent with additions to the labor force which are being counted on in the present stage of operations for directives and the Seventh FYP.

We must consider as particularly pressing that part of labor resources which is to come from transfers from liquidated or existing capacities. Therefore, it would be appropriate at the time licenses are issued for building projects begun this year and when approval is given for preliminary designs of projects to beign next year, to again check these sources of labor particularly. In the process we must take care that transfers from existing capacities do not result in a reduction of shift work or a lower number of jobs filled in existing operations. We need not emphasize the impact on the economic efficiency of buildings if one which was designed for full two-shift operations is used only for one and a quarter shifts after being put into operation.

Even with the slow-down in the dynamics of investment growth still the considerable accretion of basic assets on the one hand and the deceleration of the dynamics of production on the other are creating in certain branches unfavorable conditions for the development of utilization of basic assets. The anticipated development of the effectiveness of basic assets in relation to actual performance in the period of the last 2 years shows a deteriorating development in heavy engineering, in the building materials industry and in fuels and energy.

Besides the addition of basic assets already mentioned, the retirement of basic engineering assets will be of critical significance for the development of their effectiveness. In the first 3 years the liquidation of basic engineering assets remained under the plan level. This year's plan, therefore, stipulates a progressive increase in liquidations of roughly 13 percent. The extent of liquidated basic engineering assets, however, even so only represents not quite one-fifth (19 percent) of the annual increase in industrial basic assets.

	1978/1977	1979/1978	1980/1979
Fuels and energy	95.7	95.5	95.2
Metallurgy and ore mining	100.0	97.7	95.2
Heavy engineering	100.0	104.1	102.0
General engineering	100.0	103.5	100.0
Chemical industry	100.0	100.0	100.0
Consumer industry	100.0	100.0	100.0
Food processing industry	95.0	100.0	100.0
Building materials industry	100.0	97.2	97.1
Medical industry	96.2	100.0	102.0
Combined industry	100.0	100.0	97.4

Completion of Building Projects and Rendering Capacity Operational

In the report of the 12th plenum of the CPCZ Central Committee Presidium it was stated, among other things: "We consider putting capacity into operation as a basic task in the plan of investment. So far we have not succeeded in clearly redirecting attention at all levels of management to this final phase of the investment cycle."

Even in the formulation of the plan for this year special attention was devoted to building projects designated as essential tasks and to selected centrally reviewed building projects which are to be completed or rendered operational this year or next. Altogether, 99 capacities are to be put into operation this year, of which clearly the greatest volume is in metallurgy and engineering--34 capacities.

Of the additional capacities for this year let us list at least the most important ones:

--In the fuels branch--in the mining of brown coal--it will mainly be necessary to bring to projected parameters (or at least approximate them) large-scale machine technology in the North Bohemian brown coal basin. Increased capacity of the transit gasline depends on meeting the deadlines for putting several compressor stations into operation. By the end of this year the second unit at the atomic power station in Jaslovske Bohunice should make a substantial addition to our power capacity;

--In metallurgy the capacities of the so-called tubular program will be put into operation and several capacities connected with insuring the atomic energy program. In engineering it will be capacity for the manufacture of tractors, trucks and textile machinery;

--One of the critical capacities this year will be the new ethylene unit for Petrochemie II in Litvinov. Additional production of plastic materials, especially next year, depends on its successful establishment of operations. In the wood-processing industry it is capacity for the production of wood-chip boards and furniture;

--In the production of building materials a modern factory for the production of tiles in Rakovnik and a cement plant in Prachovice will be put into operation.

The plan for making capacities operational this year represents a challenging program. Right after the beginning of the year it will be necessary to take appropriate measures to meet this challenge. The attention of the investors as well as the suppliers must be focused on this.

The attention of investors must be directed, in addition to insuring completion of the projects, to attaining projected parameters at these capacities for appropriate running operations. Analysis of experiences of recent years in evaluating completed building projects shows that, among the main reasons for lower parameter levels than those projected, are unreliability of equipment, technical deficiencies in equipment functions but also a shortage of workers at the new capacities or their inadequate qualifications at the time test runs were started.

We must not forget that the successful operation of capacities in respect to planned indicators in the last 2 years of the Sixth FYP will determine to a considerable extent the tempo of production growth in the first years of the Seventh FYP.

Preparatory and Design Documentation of Building Projects for the Years 1979 and 1980

Just as in past years so also in preparation of the plan for this year too and for directives for 1980, there were organized under the guidance of the Federal Ministry of Technological Investment Development reviews of predesign and design preparations of building projects. Unfortunately, we must state that the status of preparation for buildings which were approved in the directives has not improved. Indeed, what is more, in some branches this state of affairs is rather worsening. In sum, the review showed that, with respect to building projects proposed in the directive for commencement this year, only 60 percent had approved preliminary designs within the specified time limit, and this included only 51 percent of the projects designated also for preparation as essential tasks. With respect to building projects which were generally designated also for preparation as essential tasks. With respect to building projects which were generally designated in the directives to begin in 1980, only 30 percent were approved in the time limit for design work and this included only 18 percent of the essential tasks.

The situation with respect to investors included in the Ministry of Fuels and Power has developed especially unsatisfactorily, where for 2 years a total of only 18 out of 58 building projects had approved preliminary designs or design work within the prescribed deadlines. Nor has the situation in metallurgy and in heavy engineering improved over the preceding year when the preparation of even buildings designated as essential tasks was delayed. Shortcomings in pre-design and design preparation persist, however, also in other branches. Last year's analysis also shows that the main cause is not a shortage of design capacity. The main reasons for delays in design preparation continue to be delays in preparation at the stage prior to design commencement (that is, in investment planning and project work), in certain unclarified conceptual problems of investors and at times in reluctance of suppliers to cooperate effectively.

Some of the shortcomings in preparation were eliminated during the last months of last year and so certain building projects were able to remain in the plan. However, inadequate timely design preparation was one of the main reasons for the shifting of building projects in the years 1979 to 1981. It shows the need for more consistent procedures in the actual preparation of building projects. That was one of the reasons why this year, as opposed to several preceding years, the approved plan does not include either "reserves" or "series of projects with incomplete preparation," where the government would gradually decide, in the course of the year, when they were to start.

Quality indicators of building projects which were prepared in time are not always satisfactory. That is precisely why it was decided to check again the indicators for economic efficiency in the case of those building projects where not even an average standard was attained from a given sector.

As we already stated, for buildings begun this year this is to be done no later than at the time of licensing, for buildings which are to be started in 1980 at the time of approval of preliminary designs and for construction for 1981 when the design work is approved.

In the report of the 12th plenum of the CPCZ Central Committee Presidium it says, among other things: "We must be more demanding for construction which we want to begin in coming years. The requirement for returns on capital invested is categorical." This requirement is hardly met in the case of building projects which take 19 years, for example, to give returns. Why, if we take into consideration also the time of execution, then at the rate of current technical progress, the reasonable usage of these kinds of capacities would represent scarcely one-third of their total return from the time of building commencement.

From the standpoint of economic efficiency of new buildings we expect qualitative progress also in strengthening organizations for expertise all the way up to the reinforcement of staffs of state experts. Perhaps discussion of the conclusions of expert evidence in the case of fairly extensive projects in the federal and national governments will contribute to this.

Provision of Supplies for Capital Construction in 1979 and 1980

No little attention in plan preparation was devoted to balancing the resources for building (construction work and machinery supplies) with the requirements of planned capital construction. It would seem that with the decelerated tempos of investing this work accord should be achieved more easily. This is not true, because the accord between the required structure of deliveries and work according to capital construction and the composition of its plan as a whole is more demanding on the development of the structure of supplier capacity. It is also true for this part of supplies that the volume of supplies is not critical for capital construction as a whole but only the volume of supplies for construction with RN over Kcs 2 million and construction in categories of branches with special systems of regulation. The challenge increases also by restrictions on starts with greater emphasis on the final cycle of construction.

Some changes are perceptible also in the basic structure of proportions of deliveries of construction work and machinery accoridng to central domestic bodies and from imports, as can be seen in the table that follows.

A positive feature in the balance of construction work is the higher proportion of construction work from supply organizations and within their framework from both ministries of construction. More attention will have to be given in plan preparation for 1980 to the development and proper classification of construction capacities managed by federal bodies. Efforts to restrict the import of building capacities in the last 2 years have so far not been particularly evident. All the more urgent is the need to reject further proposals for this form (not always economically advantageous) of providing construction work here.

	1978	1979	1980
Construction work	100.0	100.0	100.0
From supplier organisations	75.7	77.5	78.6
Of which			
Ministry of Construction, CSR and SSR	58.1	61.3	60.7
Others, managed by the national governments	10.7	8.6	10.4
Federally managed	6.9	7.6	7.5
From non-construction organizations	21.6	20.2	19.2
From abroad	2.7	2.3	2.2
Machinery and equipment	100.0	100.0	100.0
From domestic production	71.5	73.4	71.8
Of which from			
--Ministry of Metallurgy and Heavy Engineering	25.5	27.2	27.2

continued	1978	1979	1980
--Ministry of General Engineering	28.9	30.2	29.8
--Other domestic suppliers	17.1	16.0	14.8
From abroad	28.5	26.6	28.2

In obtaining supplies of machinery and equipment this year there is a shift from importation (especially from non-socialist countries) to domestic suppliers. We consider it urgent to increase the share of deliveries from the Ministry of General Engineering, especially with respect to proper utilization of supplies of machinery from this production for building projects with RN over Kcs 2 million.

A checkered balancing of supplies of construction work and machinery and equipment according to producers and consumers was worked out for this year and next year in distribution for buildings with RN over Kcs 2 million and remaining deliveries.

Experiences of recent years give special significance to the importance of balancing supplies of machinery for building projects with RN over Kcs 2 million. In this part the proportion of deliveries from enterprises of metallurgy and heavy engineering increases, as the table shows.

	1978	1979	1980
Machinery and equipment	100.0	100.0	100.0
From domestic production	71.8	72.3	73.0
Of which from			
--Ministry of Metallurgy and Heavy Engineering	45.2	46.3	45.7
--Ministry of General Engineering	14.6	10.3	11.7
--Other domestic suppliers	12.0	15.7	15.6
From abroad	28.2	27.7	27.0

Like last year, this form represents an intensification of planning methods. Forms of material interestedness of leading economic workers of suppliers are also linked with this part of their deliveries.

Supply and consumer relations at building projects designated as essential tasks were negotiated separately for this year and next. Working methods in this area are being intensified. A larger number of buildings was negotiated on the basis of diagrammatic charts and building conditions. Unfortunately, we did not attain our full objective, except for volume indicators, to stipulate, together with the plan for these buildings, also specific pro-

gressive deadlines which would determine early completion of these buildings. This is a job that still awaits consummation.

In addition to the volume of work which is to be carried out on buildings designated as essential tasks and the volume of building work which is to be carried out in places on concentrated construction (in the North Bohemian kraj, in Prague and Bratislava), the plan also assigned both ministries of construction the extent of work which is to be carried out on completing buildings. New to the planning of construction work for capital investment this year is the goal to reduce the number of building projects currently executed by both ministries of construction by 12 percent this year and by 20 percent in 1980. It need not be emphasized that application of this indicator does not refer to the obligation of builders with respect to building projects designated as essential tasks, nor does it apply to centrally reviewed construction. At stake here is one of the deterrents to fragmentation of building capacities in the course of the year when, according to analyses of recent years, the number of buildings constructed, especially in the category of "other " construction, was constantly on the rise, contrary to the original plan.

With a view to satisfying supply and demand aspects of capital construction this year and next we consider as critical the provision of supplies of machinery and equipment, including their installation, for buildings over Kcs 2 million within prescribed deadlines and in the required structure, especially from our engineering industry.

The 12th plenum emphasized that the last 2 years will determine to a considerable extent the attainment of the goals of the entire Sixth FYP. In any case, from the viewpoint of capital construction it is necessary to consider the critical importance of capacity which is supposed to be operational in the last 2 years and thus also for the whole FYP.

Let us proceed on the assumption that planned volumes according to this year's plan and directives for next year will be maintained and let us make at least a concise review of the development of overall volume indicators for the Sixth FYP as a whole. The total volume of investment will be on the level of the Sixth FYP or 1 to 1.4 points under it. In the structure of work and deliveries then, construction operations would not be fulfilled by 4 to 4.5 percent and machinery deliveries would be overfulfilled by 3 percent. Of the construction operations, almost 7 percent of construction work from building supply organizations will remain unmet, while there will be a certain excess from non-building organizations and from imports.

With this overall consistency, however, there will be differences in the plan composition too. Whereas construction projects with RN over Ksc 2 million and buildings under special regulations will remain unfulfilled by approximately 6 to 6.5 percent, constructions up to Kcs 2 million in RN and SZNR would be overfulfilled by [redacted] percent.

The actual results of the Sixth FYP will be shown only through the demanding actual realization of capital construction this year and next. At the same time we will surely not place the proof on overall "invested" resources but rather the final effects of capital construction in capacities put into operation and their efficient service in the future. Therefore, in conclusion, let us mention one of the points from the report of the 12th plenum of the CPCZ Central Committee Presidium where it states: "In capital construction concentrate the forces of all suppliers on completing building projects and making capacities operational within planned deadlines and technical-economic parameters."

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CZECHOSLOVAKIA

PUMPED-STORAGE HYDROELECTRIC PLANT POSSIBILITIES SURVEYED

Prague ENERGETIKA in Slovak No 3, 1979 pp 120-123

[Article by Eng Stefan Hromada, ScC, and Eng Vladimir Belovic, Power Research Institute, Research and Development Base, Prague, Branch Office in Bratislava: "Results of Survey of Prospects for Construction of Pumped-Storage Hydroelectric Plants in the CSSR"]

[Text] In modern times which make great demands on power engineering, every state seeks economical exploitation of its natural resources of power. So does the CSSR. Major installations of units in atomic power plants which will operate in the basic daily load diagram zone are under consideration for the development of the electrification system (ES) in the CSSR as in all states with advanced industry. In order to guarantee reliable operation of the ES, these types of power plants call for construction of special power plants with great amounts of available power, rapid rise time and necessary functional facilities. This is a problem which every state tries to solve to the best of its abilities, namely, by exploiting its own sources of power and by importing or trading energy.

In the CSSR it appears that because of a lack of liquid fuels it will be feasible to build special condensing power plants only to a very limited extent and in exceptional cases. From studies thus far, it is evident that the CSSR has good preconditions for the construction of pumped-storage hydroelectric plants (PVE) which may fulfill the quantitative and qualitative objectives necessary for the development of the ES. Their advantageous dynamic properties, control and availability not only make it possible to cover the peak times of daily load diagrams (DDZ) but they also find their application in the ES, particularly in covering the steep parts during the morning stages of the daily load diagrams, the needs for reactive energy in the turbine and compensating operation, the control needs in the extent of the turbine and pumping operations, as well as the share of rotary and rapid reserves.

Sites for PVE Under Study in the CSSR

Thus far 299 sites for the PVE have been surveyed in the CSSR, 109 of them to a greater detail. Research and processing of basic data on individual

sites in the materials[1,2,3,4,5,6,7,8] determined that the PVE under study and included in the situation shown in Fig. 1 represent 58,439 MW of installed capacity with total annual production of 82,129 GWh and pumping consumption of 114,282, GWh, with resulting total efficiency $\eta_{\delta} = 0.72$. By intensification of survey and research the conclusion was reached that 37 sites may be realistically considered for selection in the ES development prior to year 2000; they represent total installed capacity of 23,447 MW and total average annual production of 36,471 GWh with annual pumping consumption equal to 50,082 GWh.

The sites for PVE are located in Dalesice, Dlouhe Strane, Krivoklat-Cerveny Kamen, Cesky Krumlov II, Labska, Hrimezdice, Sumny Dul, Pozar, Zleb, Slavic, Bradlo, Hardegg, Cukrova Bouda, Byci Skala, Vilemov, Rejstejn, Raspenava, Svetla Hora, Sendraz, Spalov and Skuhrov. According to Tables 1 and 2, these PVE represent installed capacity of 12,090 MW with total average annual production of 18,998 GWh, of which 18,754 GWh from repumping and 244 GWh from natural current. Their total annual pumping consumption amounts to 25,602 GWh. The sites in the SSR are in Cierny Vah, Ipel, Hrhov, Soltyska, Povazske Podhradie, Devinsky Lom, Ostra Luka, Slatinka, Katarinska Huta, Kunova Teplica, Mala Vieska, Nizna Mysla, Hoskora, Nalepkovo, Zlata Bana and Nolcovo. In general, their installed capacity may be 11,357 MW with total average production from repumping equal to 17,473 GWh and with annual repumping consumption of 24,480 GWh, according to Tables 1 and 3 prepared by survey[9] which includes also their technical parameters and economic indicators. The above-mentioned PVE are projected for 3.5 and 7 hours of daily turbine operation, according to the natural characteristics of the site and the needs of the ES development.

From the hitherto results of the prospecting studies and from the research report 8 it follows that in the CSSR there are also PVE with longer periods of daily turbine operation in the weekly repumping cycle. Such sites are mainly the PVE in Krivoklat-Cerveny Kamen, Vilemov-Bila Skala, Hrimezdice, Kratusin, Krpelicky Vrch, Kunova Teplica, Ostra Luka and Nalepkovo. It should be mentioned, however, that the above-mentioned values in the planned hydroelectric plants [VE] and PVE will be gradually specified in greater details in the course of further planning preparations and selection of the sites.

Thus far, eight PVE with 221 MW total installed capacity and 465 GWh average annual production have been built in the CSSR, of which 145 GWh are generated from natural currents and 320 GWh from repumping, according to Table 1. Those PVE in the CSR are located in Stechovice II, Cerne Jezero and Pastviny; their installed capacity amounts to 45 MW and their average annual production from repumping to 50 GWh at annual repumping consumption of 86 GWh, according to Table 1. The PVE built in the SSR are located in Dolny Jelenec, Dobsina I, Ruzin I, Liptovska Mara and Miksova II, where according to[9] the installed capacity is 176 MW and total average annual production 415 GWh, 145 GWh from natural currents and 270 GWh from repumping, with 363 GWh annual pumping consumption. Under construction are PVE in Dalesice which began operation in 1978 and in Cierny Vah where operation is scheduled to start in 1981-1983.

Furthermore, in the stage of preparation are the PVE in Dlouhe Strane whose construction is planned for 1978-1985, and in Krivoklat-Cerveny Kamen with construction scheduled for 1984-1990. According to the results thus far of research and survey for the project, groups of sites have been proposed for a selection on the basis of more intensive studies and more specific requirements of the ES development.

The following sites have been proposed for selection for individual five-year plans by survey[9]: In 1985-1990 the PVE in Slatinka and for the selection of the southern branch of the PVE on the Ipel River, in Soltyska, Hrhov, Ostra Luka and Kunova Teplica; for the 1990-1995 period, the group of PVE includes Zleb, Sumny Dul, Hrimezdice, Raspenava, Devinsky Lom and Povazske Podhradie; for the 1995-2000 period the group of PVE consists of Vilemov, Svetla Hora, Cesky Krumlov II, Cukrova Bouda, Slavic, Hoskora, Nolcovo, Mala Vieska, Dierova and Nizna Mysla.

It is self-evident that it will be necessary to pay attention to individual above-mentioned groups and to intensify gradually the preparation of plans for individual sites so as to achieve an appropriate headstart before beginning construction.

The selection and building of the PVE under study in the CSSR depend considerably on environmental protection. For those reasons survey[3] proposed that the following sites be eliminated: the PVE in Struhadlo and Temny Dul in the Krkonose Mountains National Park; the PVE in Vysoky Stolec, Stodulky, Jezerni Hora and Dul Gustav I in the protected scenic area of the Sumava Mountains; the PVE in Keprnik and Vysocany in the protected scenic area of the Jeseniky Mountains; and the PVE in Krovina in the protected scenic area of Zdarske Mountains. From the viewpoint of completeness, the above sites are marked in the situation in Fig 1, however, they have not been included in the selection for the ES development.

Prospects for Construction of PVE on Waterwork Reservoirs

In the scope of the survey work[9] the problems concerning the prospects of building the PVE adjacent to waterworks reservoirs have been studied. Research has shown that there are sites near waterwork reservoirs in the CSSR where PVE may be built. Among such sites in the CSR are the PVE plant in Rejsten with 436 MW installed capacity and 774.8 GWh total production (of which 83.6 GWh from the natural current) according to survey[10]; the PVE in Vilemov which according to survey [11] has 414 MW projected installed capacity with average annual production of 451.4 GWh at 6-hour daily turbine operation; the PVE in Skuhrov with installed capacity of 161.0 GWh at 5-hour daily turbine operation according to survey[12]. Similar sites in the SSR are specified in survey[13]. Among such sites in the SSR are the PVE in Ocova-Kruhy with installed capacity of 552 MW and average annual production of 826 Gwh at 5-hour daily turbine operation, and the PVE in Tuzinna-Stary Salas with installed capacity of 484 MW and average annual production of 726 GWh at 5-hour turbine operation daily. In view of the fact that this concerns waterworks reservoirs, it is necessary to focus attention on the

change of quality of the water in the upper and lower reservoirs when the water passes through the turbines and is pumped during reverse pumping operations. In the scope of research study[9] conducted by the Research Institute for Water Economy in Bratislava the above problem has been researched in the PVE of Dobsina and in the PVE of Ruzin. The results are presented in research report[14].

The following conclusions stem from the results of the study thus far: From the experimental survey of the PVE in Dobsina and the PVE in Ruzin it follows unambiguously that the quality of water remained unchanged by its passage through the turbine and by reverse pumping. Reverse pumping does not negatively affect the quality of water; on the contrary, the positive effect produced by mixing which disturbs the stratification would be only to the benefit of waterworks reservoirs.

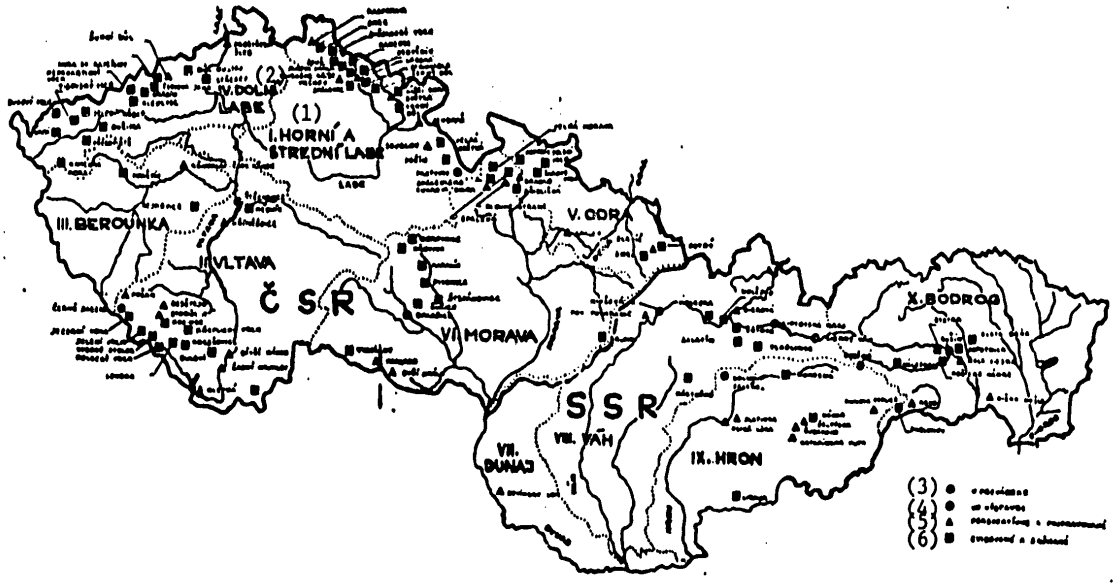
It is difficult to break down the amount of extractive substances, such as oils, into amounts entering the reservoirs with the current or from the turbine. However, it may be said that the amount of such substances found in individual reservoirs does not exceed the amount that could not be removed by treating the water. In order to turn the results obtained in the Dobsina and Ruzin reservoirs into a fully valuable basis for the plan of PVE adjacent to waterworks reservoirs, it was recommended to resolve the next stage of this task which would involve comparison of the results and information obtained in one of those reservoirs with the qualitative changes in some of the existing waterworks reservoirs.

Conclusion

It may be said in conclusion that the CSSR has excellent natural conditions for the construction of PVE with more than 3.5 and 7 hours of daily turbine operation and with a longer period of daily turbine operation in the weekly repumping cycle. In view of the fact that extensive construction of waterworks reservoirs is under consideration for the future, these prospects must be exploited for economic reasons for the construction of PVE. For their appropriate selection, preparation and implementation in the future up to year 2000 the survey and research project must be gradually and expeditiously planned. According to the results thus far of the survey of future requirements for the ES development in the 1986-1990 five-year plan, it appears necessary, in agreement with the plan of the Federal Ministry of Fuels and Power and the national ministries of forestry and water economy, at the same time to implement the task of planning and geological survey of the PVE in Krivoklat-Cerveny Kamen where the plan must be completed in 1981, and furthermore, of the PVE in Kunova Teplica, the PVE on the Ipel River and the PVE in Hrhov, and for the 1991-1995 period a technological-economic analysis with preliminary geological survey of the PVE in Zleb, Devinsky Lom and in Hrimezdice. For the 1995-2000 five-year plan survey of the PVE in Vilemov, Nolcovo, Svetla Hora, Mala Vieska and in Cukrova Bouda must be intensified.

However, it must be stressed that the proposal for the selection of the sites and the year of their construction depend not only on the ES development, the investment plan for the construction, and the preparation of the plan but also on working capacities and other effects of the national economic development. For those reasons it is logical that the proposal for the selection of sites for the VE and PVE as well as the year of their construction will be specified gradually and adapted gradually in greater detail and therefore, these problems also will require considerable attention.

Fig. 1. Situation of Pumped-Storage Hydroelectric Plants in the CSSR.



Key:

1. Upper and Middle Elbe River
2. Lower Elbe River
3. In operation
4. Under Construction
5. Planned and Projected
6. Filed and Surveyed

Table 1

(1) Sekundárny hydroenergetický potenciál tokov ČSSR

(2) p. č.	(3) Označenie PVE		(4) Celkový inštalovaný výkon	(5) Priemerná ročná výroba			(9) Priemerná ročná spotreba na čerpanie
				(6) celková	(7) z prírodn. prietokov	(8) z prečerpávania	
			MW	(10) (GW/rok)			
1	2		3	4	5	6	7
1	(11) Vybudované PVE	ČSR	45	50	—	50	86
2		SSR	176	415	145	270	363
3		ČSSR	221	465	145	320	449
4	Skúmané a (12) študované lokality PVE	ČSR	40 133	53 231	244	52 987	74 003
5		SSR	18 306	28 898	—	28 898	40 279
6		ČSSR	58 439	82 129	244	81 885	114 282
7	Reálne PVE (13) pre výber do r. 2000	ČSR	12 090*	18 998*	244	18 754*	25 602*
8		SSR	11 357**	17 473**	—	17 473**	24 480**
9		ČSSR	23 447	36 471	244	36 227	50 082
10	(14) Vybudované a reálne pre výber do r. 2000	ČSR*	12 135	19 048	244	18 804	25 688
11		SSR**	11 533	17 888	145	17 743**	24 843
12		ČSSR	23 668	36 936	389	36 547	50 576

(15)* vrátane PVE Dalešice
(16)** vrátane PVE Čierny Váh
(17)*** vrátane PVE Dierová

Key:

1. Secondary Hydroenergetic Potential of Water Streams in the CSSR
2. Current No.
3. Designation of the pumped-storage hydroelectric plant
4. Total installed capacity
5. Average annual production
6. Total
7. From natural currents
8. From repumping
9. Average annual repumping consumption
10. GW/year
11. PVE already constructed
12. Surveyed and assessed sites for PVE
13. Realistic selection for PVE prior to year 2000
14. Constructed and realistically considered for selection before year 2000
15. * Including PVE in Dalesice
16. ** Including PVE on Cierny Vah River 17. *** Including PVE in Dierova

Table 2

(1) Sekundárny hydroenergetický potenciál ČSR podľa dielčích povodí SVP

(2) p. č.	(3) Dielče povodie podľa SVP		(4) Celkovo PVE skúmané a študované		(5) Reálne PVE pre výber do r. 2000		(6) Vybudované PVE	
			(7) Výkon [MW]	(8) Výroba [GWh]	(7) Výkon [MW]	(8) Výroba [GWh]	(7) Výkon [MW]	(8) Výroba [GWh]
1	2		3	4	5	6	7	8
1	I	Horné a stred. Labe (9)	9 811	13 970	2 464	4 070	3,0	5,30
2	II	Vltava (10)	7 617	10 688	1 816	3 434	41,5	44,77
3	III	Berounka (11)	2 653	4 177	1 544	2 846	—	—
4	IV	Dolní Labe (12)	8 311	10 063	1 108	1 420	—	—
5	Labe spolu	(13)	28 292	37 898	6 932	11 770	44,5	50,07
6	V	Odra (14)	4 171	5 155	2 409	3 076	—	—
7	VI	Morava (15)	7 670	9 934	2 749*	4 152*	—	—
8	ČSR celkom	(16)	40 133	52 987	12 090*	18 998*	45	50

(17) * vrátane PVE Dalešice

Key:

1. Secondary Hydroenergetic Potential of the CSR According to Partial River Basins of the State Plan for Water Utilization [SVP]
2. Current No
3. Partial river basin according to the SVP
4. Total PVE surveyed and assayed
5. PVE plants realistically considered for selection before the year 2000
6. PVE already constructed
7. Capacity
8. Production
9. Upper and middle Elbe River
10. Ultava River
11. Berounka
12. Lower Elbe River
13. Elbe River - total
14. Oder River
15. Morava River
16. CSR total
17. * Including PVE in Dalesice

Table 3

Tab. 3

(2) P. č.	(3) Dielčie povodie podľa SVP		(4) Celkové PVE študované a skúmané		(5) Reálne PVE pre výber do r. 2000		(6) Vybudovan é PVE	
			(7) Výkon [MW]	(8) Výroba [GWh]	(7) Výkon [MW]	(8) Výroba [GWh]	(7) Výkon [MW]	(8) Výroba [GWh]
1	2		3	4	5	6	7	8
1	VII	Dunaj vlast. tok (9)	1 305	2 153	1 305	2 153	—	—
2	VIII	Váh (10)	6 544	11 336	2 848**	4 349**	100,4	192,32
3		Nitra	495	594	—	—	—	—
4		Váh spolu (11)	7 039	11 932	2 848**	4 349**	100,4	192,32
5	IX	Hron	1 152	1 883	1 139	1 866	1,98	2,68
6		Ipeľ (12)	1 385	2 123	1 031	1 465	—	—
7		Slaná	2 524	3 623	1 804	2 651	—	—
8		Hron spolu (13)	5 061	7 629	3 974	5 982	1,98	2,68
9	X	Hornád	4 901	7 184	3 230	4 989	73,6	75,00
10		Bodrog (14)	—	—	—	—	—	—
11		Poprad - Dunajec	—	—	—	—	—	—
12	Spolu Hornád - Bodrog (15)		4 901	7 184	3 230	4 989	73,6	75,00
	SSR celkom (16)		18 306	28 898	11 357**	17 473**	175,9	270,20

(17)** včítane PVE Čierny Váh

Key:

1. Secondary Hydroenergetic Potential of the SSR According to Partial River Basins of the SVP
2. Current No
3. Partial river basins according to the SVP
4. Total PVE surveyed and assayed
5. PVE realistically considered for selection before the year 2000
6. PVE already constructed
7. Capacity
8. Production
9. Danube - the current proper
10. Vah River
    Nitra
11. Vah River - total
12. Hron River
    Ipel River
    Slana River
13. Hron River - total
14. Hornad River
    Bodrog River
    Poprad-Dunajec River
15. Hornad-Bodrog - total
16. SSR total
17. ** Including PVE on the Cierny Vah River

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